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*On the Action of Crystallized Surfaces upon Light.* By David Brewster, LL.D. F.R.S. Lond. and Edinb. In a Letter addressed to the Right Hon. Sir Joseph Banks, Bart. G.C.B. P.R.S. &c. &c. Read February 25, 1819. [*Phil. Trans.* 1819, p. 145.]

It has been remarked by Malus, that the action which the first surface of Iceland spar exercises upon light, is independent of the position of its principal section; that its reflecting power extends beyond the limits of the polarizing forces of the crystal: and that as light is only polarized by penetrating the surface, the forces which produce extraordinary refraction begin to act only at this limit. He also remarks, that the angle of incidence at which this spar polarizes light by partial reflection is  $56^{\circ} 30'$ ; and that, whatever be the angle comprehended between the plane of incidence and the principal section of the crystal, the ray reflected by the first surface is always polarized in the same manner.

Dr. Brewster's experiments detailed in this paper lead him to opposite conclusions, and indicate an extension of the polarizing forces *beyond* the crystals. He also shows that the force of double refraction and polarization emanates from the surface of bodies, though its intensity depends upon the inclination of the surface to the axis of the crystal; and that the ordinary or extraordinary image may be extinguished at pleasure in any doubly-refracting crystal, which is thus converted into a singly-refracting crystal; that the change in the angle of polarization, produced by the interior force, depends on the inclination of the reflecting surface to the axis of the crystal, and upon the azimuthal angle, which the plane of reflection forms with the principal section; and that the change in the direction of the polarization depends upon the angle which the incident ray forms with the axis of the crystal.

*On the Specific Gravity and Temperature of Sea-Waters, in different Parts of the Ocean, and in particular Seas; with some Account of their Saline Contents.* By Alexander Marcet, M.D. F.R.S. &c. Read May 20, 1819. [*Phil. Trans.* 1819, p. 161.]

After some preliminary remarks upon the labours of others in this department of inquiry, Dr. Marcet proceeds to the immediate objects of his own investigation, which were to ascertain the specific gravity of many specimens of sea-water from different parts, and afterwards to examine their saline contents. The results relating to the first of these objects are prefaced by an account of the mode of taking the specific gravities, and of the instrument by which the water was raised, and of which two plates are annexed. The author then proceeds to the inferences deducible from his experiments, which, for the sake of conciseness, are given in the form of tables; whence it appears that the ocean in the Southern hemisphere is rather more salt than in the Northern, in the proportion of 1029.19 to 1027.57. The mean specific gravity of specimens from various parts of the